DETAILED ACTION

The examiner acknowledges the receipt of applicants' amendments/arguments dated 12/30//2010. Claims 1-5, 7, 9-10, 13-31 pending.

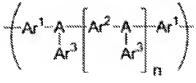
Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. **Claims 1-5, 7, 9-10, 13-19, 20, 24 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable by Towns (WO 03/035714).**

2. **Regarding Claims 1-3, 24-27,** the applicant claims an optionally substituted oligomer of polymer comprising a repeat unit of Formula 1:

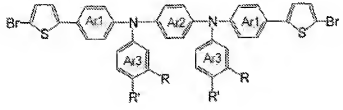


Formula 1

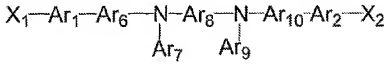
Wherein n is at least 1; each A is N or P; each Ar1 and Ar3 is arylene or heteroarylene; Ar2 is arylene or heteroarylene containing a linking ring to which the two A atoms are both directly linked and at least one of Ar1 or Ar2 is substituted with at least one

substitiuent. Applicant further claims a second repeating unit wherein the second repeat unit is selected from optionally substituted phenyl, spirobifluorene, indenofluorene, heteroaryl or dihydrophenanthrene.

Towns discloses an oligomeric material where the first repeat unit is represented by formula T-1 (page 4):



Formula T-1 shows n =1, N corresponds to applicants' A group, Ar1 corresponds to applicants' Ar1, Ar2 corresponds to applicants' Ar2 and Ar3 corresponds to applicants' Ar3. The Ar2 linking group connects both N atoms. Formula T-1 is a specific example of generic Formula T-1A (page 3):



wherein X_1 and X_2 are the same or different polymerisable groups and wherein Ar_1, Ar_2, Ar_6, Ar_7, Ar_8, Ar_9, Ar_{10} are the same or different substituted or unsubstituted aryl or

heteroaryl groups. Examples of groups Ar_1, Ar_2, Ar_3, Ar_4, Ar_5 Ar_6, Ar_7, Ar_8, Ar_9, and Ar_{10} include such groups as phenylene, thiophene, pyrrole, furan, pyridine and biphenylene.

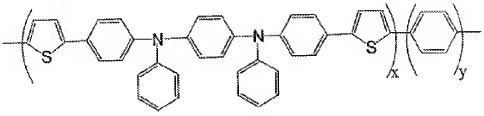
The aryl or heteroaryl groups Ar_3, Ar_4, Ar_5, Ar_6, Ar_7, Ar_8, Ar_9, and Ar_{10} may be substituted with moieties selected from the group comprising alkyl, perfluoroalkyl, alkylaryl, arylalkyl, heteroaryl, aryl, alkoxy, aryloxy and thioalkyl. Preferred substituents are butyl and sec-butyl.

Formula T-1A shows that Ar6/Ar8 and Ar9/Ar7 (which correspond to Ar1, Ar2 and Ar3 in applicants' Formula 1) can have a perfluoroalkyl substitiuent (per claim 2-3 and 24-26) (page 4).

Formula T-1A also shows that Ar1-Ar6 and Ar10-Ar2 can be phenyl groups or named as a unit biphenyl groups. Applicant in Formula I shows Ar1, Ar2 or Ar3 as arylene which is viewed as inclusive a biphenyl group.

As Towns discloses Formula(s) T-1 and T-1A which encompass applicants' Formula 1 where each of the Ar groups can be substituted with a an alkyl or perfluoroalkyl substitiuent, it would have been obvious for a person of ordinary skill in the art to have made a series of monomers with varying locations of the substitution which would have included substitution at Ar6/Ar8 and Ar9/Ar7 positions which read on the instant limitations.

Towns also discloses that Formula T-1 can also be a part of the copolymer T-2 (page 11):



Copolymer T-2 shows the second repeat unit is a phenyl monomer (per claims 1 and 27).

3. **Regarding Claims 4 and 5,** Formula T-1 shows Ar1-Ar3 as phenyl groups.

4. **Regarding Claims 7 and 9,** Copolymer T-2 shows the monomer 1 conjugated to monomer 2 (per claim 7) and Ar3 can be substituted with an alkyl group or perfluoroalkyl group (page 4) (per claim 9).

5. **Regarding Claim 10,** Towns discloses a blend of copolymer T-2 and another organic compound (page 13). Copolymer T-2 can be used as hole transporting material (page 2).

6. **Regarding Claims 13 and14,** Towns show that Formula T-1 (shown above) can have bromide as a leaving group (LG) (page 4). Copolymer T-2 (above) shows the second repeat unit is a phenyl monomer. Formula T-1 shows n =1, N corresponds to applicants' A group, Ar1 corresponds to applicants' Ar1, Ar2 corresponds to applicants'

Ar2 and Ar3 corresponds to applicants' Ar3. The Ar2 linking group connects both N atoms. Ar3 can be substituted with an alkyl group or perfluoroalkyl group (page 4).

The reactions can be catalyzed by palladium (variable oxidation state metal) (page 6) (per claim14).

7. **Regarding Claim 15,** Towns discloses that reactions can be catalyzed by palladium (variable oxidation state metal) (page 6) in the presence of a base (page 8). Towns show that Formula T-1 (shown above) can have bromide as a leaving group (LG) (page 4).

8. **Regarding Claim 16,** Towns discloses that in a monomer one LG can be a reactive boron group and the other LG can be a halogen (page 8).

9. **Regarding Claims 17-19 and 20,** Towns discloses that the polymers or blend (page 13) (per claim 18) can be used in an optical device which can be an electroluminescent device (page 12) (per claims 17 and 20). The polymers or blend is located between two electrodes (page 13) (per claim19).

10. **Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Towns (WO 03/035714) in view of Allen (US 6,858,703).**

11. **Regarding Claim 21 and 23,** Towns discloses that the copolymers can be used in an electroluminescent device (pages 12 and 13) but fails to mention a switching device.

Allen discloses that triarylamine polymers are used in optical sensor, switching devices and field effect transistors (column 83, lines 20-30).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have used the electroluminescent device of Towns in applications taught by the prior art which would have included the applications disclosed by Allen which reads on applicants' claimed application, absent unexpected results.

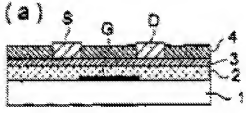
12. **Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Towns (WO 03/035714) in view of Allen (US 6,858,703) and further in view of Hirai (US 6,740,900).**

13. **Regarding Claim 22,** Towns in view of Allen disclose triarylamine polymers used as a field transistors but fail to mention the structure of the device.

Hirai discloses that an insulator layer can be placed in various locations with respect to the gate, drain and source electrodes in an organic thin-film transistor.

Hirai discloses that the organic thin-film transistor contains a organic semiconductor layer 3, a gate electrode G, a drain electrode D, and a source electrode S that are in Figure I(a) shown below:

FIG. 1 (a)



Hirai further discloses that a dielectric layer (field-effect transistor) serves as gate insulation layer 2 (column 7, lines 44-45). The above figure shows that the gate electrode G and the organic semiconductor layer 3 are both in contract with the gate insulation layer 2 located on side one. In addition, the above figure shows that the source electrode S and the drain electrode D are located on the organic semiconductor layer 3 on side two.

Hirai shows in the prior art that the claimed structure can be use as a field effect transistor.

With the reasonable expectation of success, a person with ordinary skill in the art at the time of the invention would have selected from known field-effect transistor structures and readily substituted the conductive polymers disclosed by Towns (T-2) for the organic semiconductive layer 3 disclosed by Hirai in Figure I (a) since the conductive polymers of Towns would be functional equivalents to the polymers typically used to make an organic semiconductive layer.

Claim Objections

14. Claims 28-31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

A search of the prior art did not show a triarylamine based copolymer with spirobifluorene, indenofluorene or dihydrophenanthrene as a co-monomer. The closest prior art appears to be Towns (WO 03/035714) as discussed above.

Response to Amendments/Arguments

As applicant has set forth a new set of claims (before the examiner's interview summary was prepared) with amendments to claim 1 which eliminates fluorine as a co-monomer option, the examiner has set forth new set of rejections.

The examiner continues to rely on Towns since Towns also teaches phenyl as a co-monomer as discussed above.

Applicant argues that Towns fails to show substitution at Ar1 or Ar2.

The examiner counters that Towns shows Formula T-1A where Ar6/Ar8 and Ar9/Ar7 correspond to Ar1, Ar2 and Ar3 in applicants' Formula 1 can have an alkyl or a perfluoroalkyl substituent (page 4) as discussed above.

Applicant claims unexpected results based on substitution at Ar2 or Ar3.

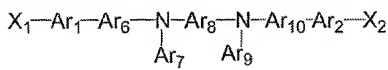
The examiner counters that Towns also shows that substituents can be at Ar6 or Ar8 (below) which is equivalent to applicants' Ar2 and Ar3. Substituents include alkyl and prefluoroalkyl which represents groups claimed by applicant.

It would have been obvious to one of ordinary skill in the art at the time of the invention to have varied the location of the alkyl substituent to optimize the emission color which would have included at an alkyl substituent Ar6 or Ar8 which reads on the instant limitations. Such obvious substitution would have produced similar results to applicants'.

Applicant argues the heteroaryl groups in Towns Formula T-1 are not in scope with the limitations of claim 1.

The examiner counters that the claim language is open ended and allows for additionally compounds in applicants' Formula 1. Additionally, the examiner point applicant to the following which was discussed above:

Formula T-1A (page 3):



wherein X_1 and X_2 are the same or different polymerisable groups and wherein Ar_1, Ar_2, Ar_6, Ar_7, Ar_8, Ar_9, Ar_{10} are the same or different substituted or unsubstituted aryl or

heteroaryl groups. Examples of groups Ar_1, Ar_2, Ar_3, Ar_4, Ar_5 Ar_6, Ar_7, Ar_8, Ar_9, and Ar_{10} include such groups as phenylene, thiophene, pyrrole, furan, pyridine and biphenylene.

The aryl or heteroaryl groups Ar_3, Ar_4, Ar_5, Ar_6, Ar_7, Ar_8, Ar_9, and Ar_{10} may be substituted with moieties selected from the group comprising alkyl, perfluoroalkyl, alkylaryl, arylalkyl, heteroaryl, aryl, alkoxy, aryloxy and thioalkyl. Preferred substituents are butyl and *sec*-butyl.

Additionally, Ar1-Ar6 and Ar10-Ar2 can be phenyl groups or named as a unit biphenyl groups. Applicant in Formula I shows Ar1, Ar2 or Ar3 as arylene which is viewed as inclusive a biphenyl group.

The applicant's arguments with respect to the pending claims have been considered but are moot in view of the new grounds of rejection necessitated by the applicant's amendment.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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